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Total Number of Pages: 02

B.Tech
PEMT5303

6th Semester Regular Examination 2016-17

NANO MATERIALS

BRANCH: METTA, MME

Time: 3 Hours

Max Marks: 70

Q.CODE:Z697

**Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)**
- a) What is nanotechnology?
 - b) What is quantum dot? Give its importance.
 - c) What is sun screen lotion?
 - d) What is Thomson's effect?
 - e) State the difference between graphite and diamond.
 - f) What is characteristics x-ray?
 - g) What is sol-gel process? Is it top down or bottom up approach?
 - h) What is nanobots? Give its applications.
 - i) What is flame pyrolysis?
 - j) What is nanocomposite? Give its examples.
- Q2 a) Define nanomaterial. (2)**
b) State the classification of nanomaterials based on their number of dimension. (8)
- Q3 a) Explain the electrical and optical properties of nanoparticles based on their size, and shape. (5)**
b) State the differences between bulk materials and nanomaterials. (5)
- Q4 a) Explain the different types of carbon nanotubes. (5)**
b) Describe the different methods of fabricating the nanotube. (5)
- Q5 a) Explain the characterisation technique to determine the particle size of nanomaterials. (5)**
b) State the differences between SEM and TEM. (5)

- Q6** a) Describe briefly the selected applications of nanomaterials as catalysis, optoelectronics and sensors. **(5)**
- b) List the disadvantages of nanomaterials. **(5)**
- Q7** The diffraction pattern of fine powders of a cubic metal was recorded using CuK_α radiation in the range of 2θ values i.e. 44.53, 51.89, 76.45, 93.01, 98.51, 122.12 respectively to the peak position. Identify the Bravais lattice and calculate the lattice parameter of cubic metal. **(10)**
- Q8** **Write short notes on any TWO:** **(5 x 2)**
- a) Magnetic properties of nanomaterials.
- b) Mechanical properties of nanomaterials.
- c) Chemical vapour deposition.
- d) Mechanical milling